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Health, Social, and Lifestyle Factors Related to Combined Alcohol and Sleep Problems

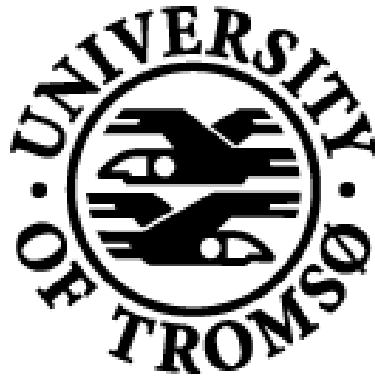
Investigating Risks of Chronic Pain, Welfare Benefits, Divorce, Smoking, and Low Physical Activity in Relation to Alcohol and Sleep Problems

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Mia Caroline Storvik

Master's thesis in psychology – May 2019





Health, Social, and Lifestyle Factors Related to Combined Alcohol and Sleep Problems:
Investigating Risks of Chronic Pain, Welfare Benefits, Divorce, Smoking, and Low Physical
Activity in Relation to Alcohol and Sleep Problems.

Mia Caroline Storvik

Supervisors:

Kamilla Rognmo

Svein Bergvik

PSY-3900

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UiT The Arctic University of Norway

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Abstract

The purpose of the study was to uncover whether there are increased risks associated to having combined alcohol and sleep problems in association to health, social, and lifestyle factors. This in comparison to having either alcohol and sleep problems, as opposed to having neither alcohol nor sleep problems. This study investigates potential risks in association to chronic pain, reception of welfare benefits, divorce, smoking, and physical activity. This was investigated by using data collected from the sixth Tromsø study, Tromsø 6. Results show that combined alcohol and sleep problems are associated to risks in chronic pain, welfare benefits, and smoking among men, and only smoking among women. For the same factors it seems that sleep is the decisive factor among women. This study has recognised some associations in combined problems and other factors, future studies are needed to decide the causality of the associations.

Keywords: Alcohol problems, sleep problems, chronic pain, welfare benefits, divorce, smoking, physical activity.

Abstrakt

Hensikten med studien var å avdekke om det er høyere risikoer forbundet med det å ha samtidig alkohol- og søvnproblematikk i assosiasjon med helse-, sosial-, og livsstilsfaktorer. Dette i sammenligning med det å ha enten alkohol eller søvnproblemer, mot det å verken ha alkohol- eller søvnproblemer. Denne studien ser på mulige risikoer i assosiasjon med kroniske smerter, trygdemottakelse, skilsmisse, røyking, og fysisk aktivitet. Dette ble undersøkt ved bruk av data innhentet fra den sjette Tromsøundersøkelsen, Tromsø 6. Resultatene viser at kombinerte alkohol- og søvnproblemer har assosiasjoner til risiko ved kroniske smerter, trygdemottakelse, og røyking blant menn, og kun røyking blant kvinner. For de samme faktorene ser det ut til at søvn er utslagsgivende faktor for risiko blant kvinner. Studien har avdekket noen assosiasjoner med samtidig problematikk og andre faktorer, mer forskning må gjøres for å avgjøre kausalitet av assosiasjonene.

Nøkkelord: alkoholproblemer, søvnproblemer, kroniske smerter, trygd, skilsmisse, røyking, fysisk aktivitet.

Preface

My interest in psychology started at a young age and have been one of my main interests for as long as I can remember. Having worked with people with different challenges has fed this interest, and at the same time made it difficult to decide which direction of psychology I consider to be “mine”. Health psychology has always been of interest and I had a tip to contact Kamilla Rognmo and Svein Bergvik. They presented me with a project they wanted a master student to write on, on alcohol and sleep problems combined. It was easy to grab the opportunity to write about something so every day-like, but still so complex, and so relatable to my field of work. Working on this thesis have been challenging, educational, and so much fun.

Search for literature and writing is done mainly by me, with feedback from my supervisors Kamilla Rognmo and Svein Bergvik. Analyses were done by Kamilla, which I am ever so grateful for. Thank you both for good feedback and supervision, even though my motivation has been wavering.

I am very grateful for my family and friends, for their confidence in me, making it so much easier to actually finish this project. Last but not least, thanks to my master’s class for our great social environment, all the smiles and laughter, the academic discussions, and the odd glass of wine.



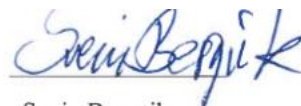
Mia Caroline Storvik

Master Student



Kamilla Rognmo

Supervisor



Svein Bergvik

Co-supervisor

Alcohol problems have become more prominent over the years since the 80s (Bratberg et al., 2016), and most of the Norwegian population consume alcohol (Moan, Storvoll, & Lund, 2017). Over 40% and 60% of Norwegian women and men consume alcohol, and approximately 90% of the population consume alcohol in the course of a year (J. Li, Wu, Selbæk, Krokstad, & Helvik, 2017). Approximately 23% of Norwegians experience alcohol misuse or dependence in their lifetime, and the 12-month prevalence is approximately 10%. Alcohol problems are more prevalent in men than in women (Kringlen, Torgersen, & Cramer, 2001).

Symptoms of insomnia have been found in approximately 11-13% of the Norwegian population (Johnsen et al., 2001; Sivertsen, Krokstad, Øverland, & Mykletun, 2009). Insomnia is recognised by having either difficulties falling asleep, frequent awakenings at night, or not feeling rested after having slept. Sleep problems are more prevalent in women than men, and among older adults (Johnsen et al., 2001; Sivertsen, Krokstad, et al., 2009).

Alcohol and sleep problems have a seemingly complex relationship. Those who experience alcohol problems have significantly higher frequency of sleep problems, while those with insomnia have twice the risk of developing alcohol problems (Ara, Jacobs, Bhat, & McCall, 2016; Crum, Storr, Chan, & Ford, 2004; Voinescu & Orasan, 2014). Chronic use of alcohol is also associated to increased sleep onset latency. Acute alcohol use generally shorten sleep onset latency, and initially two to three drinks before bedtime will promote sleep (Stein & Friedmann, 2006). However, this effect diminishes after as few as three days of use, as the body builds tolerance to the sedative effect. Those who struggle with sleep problems more often use alcohol to promote sleep than do normal sleepers, and this is more common among men than women (Roehrs, Burduvali, Bonahoom, Drake, & Roth, 2003; Stein & Friedmann, 2006). People with sleep problems also engage more often in social drinking and consume alcohol within thirty minutes of bedtime more often than those without sleep problems. Those

who are sleep deprived generally experience greater sedation faster after consuming alcohol, than those who are not (Roehrs et al., 2003).

For those who drink, there are associations to higher morbidity and mortality, especially among heavy drinkers (Christensen, Ekholm, Gray, Glümer, & Juel, 2015). Those who drink also often smoke, and smoking is a lifestyle factor that also is associated to higher morbidity and mortality. Smoking is a known risk for several diseases that also affects morbidity and mortality rates, such as cancer (Christensen et al., 2015). There are conflicting findings on morbidity and mortality in association to sleep problems (Garbarino, Lanteri, Durando, Magnavita, & Sannita, 2016; Vgontzas et al., 2010). A significant association to sleep problems and mortality has been found in men, but not in women, when experiencing chronic insomnia. This finding is significant, independent from other comorbid disorders such as alcohol consumption, smoking, and depression. Sleep problems also increase the risk for disorders that have known associations to morbidity and mortality, such as diabetes and cardio metabolic diseases (Garbarino et al., 2016). On the other hand, physical activity is associated to lower mortality (Fishman et al., 2016). Even replacing approximately ten minutes of sedentary activity with ten minutes of low activity is associated to lower mortality. Low, moderate, and vigorous activity are associated to lower mortality (Fishman et al., 2016).

Regarding combined alcohol and sleep problems in association to other factors, rather than having either sleep or alcohol problems, there is still a lot to be investigated. Our study aims to see if combined problems can be associated with higher risks in association to other factors, compared to having either alcohol or sleep problems, as opposed to having neither alcohol nor sleep problems. Specifically, we want to explore if combined alcohol and sleep problems are associated to chronic pain, reception of social benefits, divorce, smoking, and physical activity, to a greater extent than having either alcohol or sleep problems.

Health Factors and Alcohol and/or Sleep Problems

Chronic pain. Chronic pain is recognised as pain that is persistent or recurrent for at least three to six months of time. It is estimated that approximately 20% of people are suffering from chronic pain, worldwide (Treede et al., 2015).

Alcohol problems and chronic pain. Those who report drinking high amounts of alcohol are twice to three times as likely to also experience chronic pain than those who drink less, and who drink less frequently (Booker, Haig, Geisser, & Yamakawa, 2003; Thompson, Oram, Correll, Tsermentseli, & Stubbs, 2017). One of the reasons why people with chronic pain drink more, may be the analgesic effects of alcohol. This effect is to some extent dose dependent, and even though alcohol does increase the pain threshold, the effect is often small (Thompson et al., 2017).

Sleep problems and chronic pain. Over half of those who experience chronic pain, also report experiencing insomnia (Koffel et al., 2016; Lintzeris et al., 2016). Over time, it seems that worsening in sleep problems predicts worsening in pain, rather than the opposite. When assuming sleep problems and pain have a bi-directional relationship, it rather seems that sleep is a greater predictor for pain, than pain is for sleep (Koffel et al., 2016). Sleep deprivation or sleep problems reduce the pain threshold (Lautenbacher, Kundermann, & Krieg, 2006).

Combined problems and chronic pain. A population-based study conducted in Japan, including nearly 13000 participants, found that those who are current drinkers have a lower likelihood of experiencing headaches than those who do not drink. However, both alcohol consumption and sleep problems were factors associated to headache, where too little sleep was associated to experiencing headaches. This was not dose-dependent, and amount of alcohol consumed was irrelevant. These results regard both women and men, despite that women experience more headaches than men. Participants that reported experiencing

headaches, also tended to report other types of pain, and other health conditions (Yokoyama et al., 2009).

Social Factors and Alcohol and/or Sleep Problems

Welfare benefits. In Norway, most people are eligible at some point in their lives to receive some type of benefit. The prevalence of receiving benefits is fluctuant as the type of benefit depends on the life situation. Common types of social benefits are for sick leave, rehabilitation, full or partial disability, unemployment benefits and social welfare benefits.

According to the Norwegian labour and welfare administration (NAV), employees receive money for sick leave as a replacement for work income when illness or injury is the reason for not being able to work. Sick leave is usually short-term, and one can receive this benefit for up to a year (NAV, 2019c). After this time, one may be eligible for rehabilitation or disability pension. When illness or injury are significant factors contributing to reduced work ability, one is eligible to receive rehabilitation pension (NAV, 2019a). Ability to work must be reduced by at least 50%. While receiving this benefit, one must be a rehabilitee going through medical treatment and part-taking in vocational measures. The goal is that the recipient can return to work and keep working during the time. One cannot receive rehabilitation pension for more than five years. Adults between the ages of 18-67 are eligible for full or partial disability pension (NAV, 2019d). Illness or injury must be the main reason for not being able to work, and ability to work must be reduced by at least 50% to be eligible for this pension. Unemployment benefits are economic support when having become unemployed (NAV, 2019b). Those who are eligible to receive unemployment benefits have had their work hours reduced by at least half, have had a reduction in work income, and must be an active jobseeker. Social welfare benefits are temporary income arrangements, to secure proper living (NAV, 2019e). To receive social welfare, one must struggle to provide for

themselves with their own means from work income or other economic supports. Social welfare benefits are means-tested, and NAV decides what the individual receives.

Alcohol problems and welfare benefits. Individuals with alcohol problems or other substance abuse problems, cannot on all levels be compared to a population of non-abusing individuals (Meara, 2006). Few of the general welfare-receiving population have alcohol problems or other substance use disorder (Metsch & Pollack, 2005). Research has been conducted on single mothers in the U.S that receive benefits, and among those there is a higher prevalence of alcohol problems than among single mothers that do not receive benefits (Meara, 2006). Having completed high school education seems to be an important factor for alcohol problems and welfare benefits, where those who have alcohol problems and receive benefits, have significantly higher probabilities of never having completed high school (Schmidt, Zabkiewicz, Jacobs, & Wiley, 2007).

Sleep problems and welfare benefits. Sleep problems are more prevalent in women and those with lower educational levels (Mykletun et al., 2006). Women also have higher probability for receiving disability pension, along with older adults, and individuals who have lifestyle factors that affect health negatively. Those who experience sleep problems have higher probability for not going to work, and sleep problems is a risk factor for sick leave or disability pension in the future (Mykletun et al., 2006; Sivertsen, Øverland, Bjorvatn, Mæland, & Mykletun, 2009). Being unemployed is also a factor for experiencing sleep problems, both occasionally and chronically (Paine, Gander, Harris, & Reid, 2004).

Combined problems and welfare benefits. There is a lack of research on combined alcohol and sleep problems in adults. Children are, however, affected by growing up in households that receive welfare benefits (Weitof, Hjern, Batljan, & Vinnerljung, 2008). In Sweden, most people who receive benefits are single parents or people with social and/or health problems. Children that grow up in these households have increased risks for health

and social problems, and higher rates for attempted suicide. However, because of the otherwise working welfare system in Sweden, it seems that childhood environments are good enough that these risks are minimal.

Divorce. In Norway, approximately half of all marriages end in separation or divorce (SSB, 2019). Numbers show that in 2017 there were 22,111 new marriages, 10,594 separations, and 9,848 divorces. Divorce have a bi-directional relation to general well-being, that can be associated with health, social and lifestyle factors (Leopold, 2018; Teachman, 2002). Following divorce there is a change in health behaviours, risk for poverty among women, and health deterioration among men. Health behaviours often worsen in both women and men following a divorce (Leopold, 2018). People in well-functioning marriages are generally in better health and are happier than those who are unmarried or divorced (Troxel, Robles, Hall, & Buysse, 2007).

Alcohol problems and divorce. Divorce is associated with increased risk for alcohol problems (Kendler, Lönn, Salvatore, Sundquist, & Sundquist, 2017). This effect has been seen in a Swedish population, where those with a life time history of divorce had a significantly higher chance of alcohol problems and vice versa. This association is stronger in men than in women. The risk of alcohol problems seems to start a few years before the divorce happens (Kendler et al., 2017). In men it starts approximately ten to seven years before the year of the divorce, and in women approximately three years before. In both men and women, there is a peak in alcohol use at the year of the divorce, and bereavement increase the risk for first onset alcohol use disorder. A study by Reczek and colleagues (2016), found that people who never married have a higher chance for heavy drinking than people who are in a stable marriage. Women are less likely than men to be heavy drinkers, and higher baseline alcohol intake increase the odds for heavy drinking in the future. Women that remarry have higher odds for heavy drinking than do women in a stable marriage. The same

effect is not seen in men, as remarried men's drinking decrease when remarried. At all ages, unmarried men tend to drink more than married men, but this gap decreases over time. Wives and husbands drinking at baseline seem to affect the spouses future drinking in opposite directions; husbands heavy alcohol use increases wives' alcohol use, while wives drinking decreases husbands drinking over time. It seems that marriage and remarriage is positive for health and health behaviour, whereas divorce is negative (Reczek, Pudrovska, Carr, Thomeer, & Umberson, 2016).

Pattern of drinking is also associated with separation and divorce, where couples who both are heavy drinkers, or both abstain from alcohol, have lower rates of divorce than couples with different levels of alcohol use (Ostermann, Sloan, & Taylor, 2005). In mismatched couples, the odds for divorce are nearly 149% higher than in couples where both abstain from alcohol. In addition, it seems that similarities in alcohol consumption prior to marriage is a factor for entering marriage (Ask, Rognmo, Torvik, Røysamb, & Tambs, 2012).

Sleep problems and divorce. Healthy relationships are associated with positive health behaviours that positively affect sleep, whereas separation is associated with negative health behaviours that negatively affect sleep (Krietsch, Mason, & Sbarra, 2014). Marriage protects against social isolation and secures the human need for affiliation (Sbarra & Hazan, 2008). When this is broken, it triggers emotional pain, and affects the individuals state of security (Newton, Burns, Miller, & Fernandez-Botran, 2016; Troxel et al., 2007). Rather than being an individual phenomenon, sleep seems to be dyadic, as sleep problems is both a cause and a symptom of several possible factors (Newton et al., 2016). Sleep problems affects emotional regulation, and sleep problems in one or both partners contribute to marital problems. Women's sleep problems seem to be more affected by the general quality of the marriage than men's sleep problems. In healthy marriages, sleep problems are more prominent when partners must sleep separately, for example if one partner travels often for work (Diamond,

Hicks, & Otter-Henderson, 2008). Everyday proximity is important as it provides regulatory functioning.

Combined problems and divorce. No previous research has been found that look at combined alcohol and sleep problems in association to divorce. However, as Troxel and colleagues (2007) states, health behaviour is affected by divorce. Both alcohol use and sleep are health behaviours that may affect or be affected by divorce.

Lifestyle Factors and Alcohol and/or Sleep Problems

Smoking. Approximately 11% of the Norwegian population are daily smokers (SSB, 2019), where men have higher prevalence of smoking than women. Most Norwegian smokers are between the ages of 45-75. Very few smokers are between the ages of 16-24 (however, they have higher prevalence of using snuff / other products containing nicotine). Smoking remain one of the main risks for lung cancer in smoking populations worldwide (Malhotra, Malvezzi, Negri, La Vecchia, & Boffetta, 2016).

Alcohol problems and smoking. Of the Norwegian population that drink alcohol, approximately 14% reported daily smoking and 9% occasionally smoke (Moan et al., 2017). Among those with alcohol problems or heavy alcohol use, the prevalence of smoking is almost twice the rates of those without alcohol problems (Weinberger, Gbedemah, & Goodwin, 2017). Because of the negative health effects smoking and drinking have, this is often a source of worry for their kin.

Sleep problems and smoking. Smokers have approximately twice the risk of sleep problems than those who have never smoked (Costa & Esteves, 2018). Previous data associate smoking with less total sleep time, less effective sleep, and longer sleep onset latency. When the smoker has the first cigarette after waking up, and the number of cigarettes smoked per day, are both associated with sleep duration in a negative manner (Patterson, Grandner, Lozano, Satti, & Ma, 2018). Experiencing inadequate sleep duration is predictive

for worsening smoking habits. After quitting smoking, it seems that sleep problems lessen, after the phase of abstinence has passed (Costa & Esteves, 2018). Daily tobacco use in the past week was predictive of sleep quality (Larance et al., 2015). Those who have a lifetime history of ever smoking also have higher likelihood for experiencing occasional sleep problems than those who have never smoked (Chen, Steptoe, Chen, Ku, & Lin, 2017; Palmer et al., 2017) .

Combined problems and smoking. Although there were no studies to be found that directly link alcohol problems and smoking, a study done in China found that those who smoke also make other lifestyle choices that are risky for health (Masood et al., 2015). China is the largest consumer of tobacco, where approximately two thirds of adult men smoke, and is the most common cause of death that is preventable. Those who are heavy smokers, as opposed to ex- and never-smokers, eat less healthy food, exercise less regularly, spend more time watching television, are more likely to get less than 5 hours sleep, and drink more frequently and binge drink more. Also, those who smoke are over twice as likely to drink alcohol, and those who drink are more than twice as likely to smoke.

Physical activity. According to the Norwegian Directorate of Health, the recommended minimum levels of activity per week is at least 150 minutes of moderate physical activity, or 75 minutes of vigorous activity. Approximately 34% of women and 29% of men between the ages of 20-64 meet the minimum recommended amount of physical activity (Helsedirektoratet, 2016). Physical activity have a positive relationship to physiological and psychological well-being (Giesen, Zimmer, & Bloch, 2016). Inactivity is related to risks for other medical conditions or diseases, such as cardiovascular diseases (Rodgers et al., 2004). Symptoms for depression are also related to lower levels of physical activity, and depression and physical inactivity may interact to affect the risk for cardiovascular mortality (Kamphuis et al., 2007).

Alcohol problems and physical activity. People with alcohol problems are often physically inactive, and often experience comorbidity (for example with depression) (Giesen et al., 2016). As physical activity is important for psychological well-being, it may be positive for the comorbid disorders, as well as for sobriety. There has been found positive associations between physical activity and remission from alcohol use disorder, even though previous studies have come to conflicting results (Damian & Mendelson, 2017; Giesen et al., 2016). During a 12-month study, participants in a physical activity intervention group did not experience relapse during this time (Giesen et al., 2016). Physical activity was related to stable sobriety and reduced risk for relapse. Those who were physically active had a significantly higher chance for being in remission after 12 months, than those who were not, even though it is unknown whether physical activity plays a role in maintaining sobriety (Damian & Mendelson, 2017).

Sleep problems and physical activity. Physical activity is a lifestyle factor that is associated to sleep problems in adults (Chen et al., 2017; Palmer et al., 2017). Obese adults have less healthy lifestyles, that are associated to sleep problems, for example do they more often smoke (Palmer et al., 2017). Those who report poorer self-experienced health also have higher prevalence of sleep problems. Inactive adults have higher risk for occasional sleep problems than active adults (Chen et al., 2017).

Combined problems and physical activity. There is a lack of research on combined alcohol and sleep problems in adults, in relation to physical activity. However, in youth there has been found that physical inactivity is associated with engaging in binge drinking and experiencing insufficient sleep (Patte, Qian, & Leatherdale, 2018). Binge-drinking may affect circadian rhythm that affect sleep, but part-taking in physical activity regularly at least three times a week seems to increase the amount of sleep in youth. In the adult population there has been found an association between alcohol problems, sleep problems, and physical activity,

among those who smoke (Masood et al., 2015). There is a positive correlation between smoking intensity and alcohol consumption, and heavy smoking is again associated with decreased total sleep time.

The Current Study

The current study examines whether having combined alcohol and sleep problems can be associated to risks in health, social and lifestyle factors. Using data from the Tromsø Study, we investigate the risk of experiencing chronic pain, welfare benefits, cardiovascular disease, divorce, smoking, and physical activity, for individuals having both alcohol and sleep problems, versus not having alcohol nor sleep problems. Previous studies cover knowledge on separate alcohol and sleep problems in association to other factors, or alcohol and sleep problems in relation to each other. This study will contribute in covering the gap in knowledge of combined alcohol and sleep problems, in association to other factors.

Method

Design and Sample

The current study was based on Tromsø 6, which took place between 2007-08. The Tromsø Study is a population-based study of inhabitants in the northern Norwegian municipality of Tromsø. The Tromsø Study consists of seven surveys, where the first Tromsø Study took place in 1974, and the last, Tromsø 7, was conducted in 2015-16. Participants were inhabitants of the municipality, that were invited based on the population register. When receiving the invitation, participants also received a letter containing information on the study, and a four-page questionnaire. Those who went to the health examination, which was the second part of the study, received a more extensive questionnaire they were to return by mail. 19,762 men and women were invited to participate, with 12,984 men (6054) and women (6930) responding and participating in Tromsø 6 (65.7% response rate). This study used data from participants that had data on all variables included in the analysis. This includes 4504

men and 4558 women (69.78% of the participating sample) who responded to the Tromsø study.

Measures

Alcohol Problems. The Alcohol Use Disorder Identification Test (AUDIT) was used to measure alcohol problems in participants (Conigrave, Hall, & B. Saunders, 2006). This is a validated test to screen for alcohol use disorder. We used the recommended cutoff score at eight for men, and six for women for predicting alcohol problems (Perula de Torres et al., 2005). AUDIT includes ten questions on alcohol use, symptoms of alcohol dependence, and problems related to alcohol use.

Participants answered questions on alcohol use in both surveys during the Tromsø study. In the first questionnaire they were asked how often they usually drink alcohol, how many units of alcohol they usually drink when they drink alcohol (a beer, a glass of wine, or a drink), and how often they drink six units or more in one occasion. In the second questionnaire participants were asked how often in the last year have you: Not been able to stop drinking alcohol when you have started? Failed to do what was normally expected of you because of drinking? Needed a first drink in the morning to get yourself started after a heavy drinking session? Felt guilt or remorse after drinking? Been unable to remember what happened the night before because of your drinking? Questions were answered on a five-point scale with response categories being: never – less often than once a month – monthly – weekly – daily, or almost daily.

Sleep problems. Participants answered the question “how often do you suffer from sleeplessness?”. Response categories being: never, or a few times a year – 1-3 times a month – approximately once a week – more than once a week. Participants who replied to never, or a few times a year, were considered not to have sleep problems and were in one group. Participants who answered to approximately once a week or more than once a week, were

considered to have sleep problems and were in a second group, giving two groups for sleep problems.

Combined Alcohol and Sleep Problems. Participants with responses that implied that they had both alcohol and sleep problems, were combined into a separate category. These were the participants that were above cut-off score for AUDIT and had in addition responded positively to experiencing sleep problems approximately once a week, or more than once a week. For our analyses we had four groups: one group with participants that had both alcohol and sleep problems, a second group with participants that had only alcohol problems, a third group with participants that had only sleep problems, and a fourth group with participants that had neither alcohol nor sleep problems. The group with participants that had neither problem was the reference group for the analyses.

Physical Activity. The Gothenburg leisure time physical activity (Grimby et al., 2015) is a validated measure for activity, and was used to measure activity for the study.

Participants responded to whether they have been physically active in their leisure time. Response categories being: sedentary – low – moderate – vigorous. Sedentary activity included reading, watching TV or other sedentary activity. Low activity included walking, cycling, or other types of movement for at least 4 hours a week (and includes walking or cycling to work or other). Moderate included exercising, heavy gardening, shovelling snow, or similar activities. Vigorous included heavy exercising or competitive sports regularly and several times a week.

Chronic Pain. This study included one of the questions participants answered to in relation to chronic pain: do you have persistent or constantly recurring pain that has lasted for 3 months or more? Response categories were yes or no.

Cardiovascular Disease. Participants responded to whether they have experienced heart attack, angina, or stroke. Response categories being yes or no. Participants who

answered yes were in one group, and those who answered no were in a second group, giving two groups for the analyses.

Smoking. Participants answered to daily smoking with response categories being: current smoker - previous smoker - never smoked. Participants who responded to being current smokers were in one group, and previous and never smokers were in a second group, giving two groups for the analyses.

Divorce. Participants answered to being divorced, separated, married, widower, single, or in a registered partnership. For this study divorced and separated were in one group, all other responses were in a second group, giving two groups for the analyses.

Welfare Benefits. Welfare benefits were divided into two groups: those who answered yes to receiving benefits, and those who answered no to receiving them. There were originally several different categories for welfare benefits: sick leave, rehabilitation, full or partial disability pension, unemployment benefit, and social welfare. Excluded were retirees that receive old age pension.

Subjective health. Participants responded to the question “how do you consider your own health to be?”. Responses were given on a six-point scale with response options being: excellent, very good, good, neither good nor bad, bad, very bad.

Covariates.

Mental distress. For mental distress, Hopkins symptom checklist -10 (HSCL-10) was used to measure symptoms of depression and anxiety. HSCL is a validated measure (Strand, Dalgard, Tambs, & Rognerud, 2003). A short version of HSCL-90 was used, HSCL-10, with ten questions.

Mental distress was continuously used as a covariate variable. Participants answered the following ten questions: Have you experienced sudden fear without apparent reason during the last week? Have you felt afraid or anxious during the last week? Have you

experienced faintness or dizziness during the last week? Have you felt tense or upset during the last week? Have you easily blamed yourself during the last week? Have you had sleeping problems during the last week? Have you felt depressed or sad during the last week? Have you felt useless, worthless during the last week? Have you felt that everything is a struggle during the last week? Response categories were on a four-point scale with answers being: not bothered – a bit bothered – quite bothered – bothered a lot. Of these ten questions a mean score variable was made and used as a covariate variable.

Age. Age was used as a covariate variable, and participants reported age numerically.

Statistical Analyses

All analyses were performed using SPSS v25. Descriptive statistics were used to describe the sample. Pearson product moment correlation was used to examine the covariation between continuous variables for alcohol and sleep problems. Cross table analyses were used to analyse and describe the frequency of combined alcohol and sleep problems. Analyses of covariance (ANCOVA) were used to examine group differences for subjective health, and physical activity. ANCOVA was necessary when the dependent variables were continuous, and we included the covariates of mental distress, and age. The general population served as the reference group in the analyses. Multiple logistic regression was used to examine the risk for pain, cardiovascular disease, divorce, social welfare, divorce, and smoking. Logistic regression was used for dichotomous dependent variables. The general population served as reference group, adjusted for age and mental distress.

Results

Descriptive Statistics

Most women reported neither alcohol nor sleep problems (table 1). A small group of women reported having alcohol problems but not sleep problems. Almost four times as many women reported having sleep problems but not alcohol problems. A small group of women

reported having both alcohol and sleep problems. The correlation for women between alcohol and sleep problems was not significant ($r=0.021$, $p=.166$).

Most men reported neither alcohol nor sleep problems. Approximately the same amount of men reported having alcohol problems but not sleep problems, as reported having sleep problems but not alcohol problems. A small group of men reported having both alcohol and sleep problems. The correlation for men between alcohol and sleep problems was significant, though small ($r=0.145$, $p=.000$).

Table 1

Cross table for not having symptoms of sleep problems or having symptoms of sleep problems for women under and above cut-off score for AUDIT.

	Not symptoms of sleep problems	Symptoms of sleep problems	Total:	X^2
No alcohol problems	3247	967	4214	.174
Alcohol problems	254	90	344	
Total:	3501	1057	4558	

Notes: X^2 =significance level.

Table 2

Cross table for not having symptoms of sleep problems or having symptoms of sleep problems for men under and above cut-off score for AUDIT.

	Not symptoms of sleep problems	Symptoms of sleep problems	Total:	X^2
No alcohol problems	3485	422	3907	.000
Alcohol problems	482	115	597	
Total:	3967	537	4504	

Notes: X^2 =significance level.

Results show that over half of women with either combined alcohol and sleep problems, or only sleep problems, experienced chronic pain (table 3). Approximately a third of women with only alcohol problems or neither problem also experienced chronic pain. Women with either combined alcohol and sleep problems, or only sleep problems, experienced cardiovascular disease more often than those who had neither problem or only alcohol problems.

Among women who reported combined alcohol and sleep problems approximately a third were divorced. Women with either alcohol or sleep problems, or neither problem, had similar divorce rates, with less than a fifth being divorced.

Women with either combined alcohol and sleep problems, or only sleep problems, received social welfare benefits almost twice as often as women who had only alcohol problems or neither problem.

More women with either combined alcohol and sleep problems, or separate alcohol or sleep problems smoked, than women with neither alcohol nor sleep problems. Almost half of women with combined alcohol and sleep problems smoked, while just over a third of women with only alcohol problems smoked, approximately a fourth of women with only sleep problems smoked, and a fifth of women with neither alcohol nor sleep problems were current smokers.

Women with combined alcohol and sleep problems, only alcohol or only sleep problems, and neither problem, had similar levels of physical activity.

Table 3

Descriptive statistics for women with both alcohol and sleep problems, only alcohol problems, only sleep problems, or neither sleep nor alcohol problems. Means displayed for the continuous variables

	Alcohol and sleep problems	Only alcohol problems	Only sleep problems	Neither alcohol nor sleep problems
	N (%)	N (%)	N (%)	N (%)
Chronic pain				
No	40 (44.4)	169 (66.5)	379 (39.2)	2286 (70.4)
Yes	50 (55.6)	85 (33.5)	588 (60.8)	961 (29.6)
Cardiovascular disease				
No	85 (94.4)	240 (98.4)	897 (92.8)	3119 (96.1)
Yes	5 (5.6)	4 (1.6)	70 (7.2)	128 (3.9)
Divorced				
No	64 (71.7)	206 (81.1)	793 (82)	2708 (83.4)
Yes	26 (28.9)	48 (18.9)	174 (18)	539 (16.6)
Receives welfare benefits				
No	54 (60)	203 (79.9)	569 (58.8)	2579 (79.4)
Yes	36 (40)	51 (20.1)	398 (41.2)	668 (20.6)
Smokes				
No, never	12 (13.3)	49 (19.3)	329 (34)	1330 (41)
Yes, previously	36 (40)	118 (46.5)	393 (40.6)	1290 (39.7)
Yes, now	42 (46.7)	87 (34.3)	245 (25.3)	627 (19.3)
Physical activity				
Sedentary	21 (23.3)	57 (22.4)	193 (20)	536 (16.5)
Low	56 (62.2)	153 (60.2)	668 (69.1)	2218 (68.3)
Moderate	12 (13.3)	40 (15.7)	99 (10.2)	459 (14.1)
Vigorous	1 (1.1)	4 (1.6)	7 (0.7)	34 (1)
	M (SD)	M (SD)	M (SD)	M (SD)
Own health	3.36 (.89)	4.0 (.69)	3.44 (.80)	4.0 (.73)
Total:	90	254	967	3247

Notes: M=mean; SD=standard deviation.

Results show that approximately half of men with combined alcohol and sleep problems, or only sleep problems, experienced chronic pain (table 4). Less than a third of men with only alcohol problems experienced chronic pain, and approximately a fifth of men who had neither alcohol nor sleep problems experienced chronic pain. Few men reported having cardiovascular disease, and men with only sleep problems reported it more often than men

with combined alcohol and sleep problems, only alcohol problems, or neither alcohol nor sleep problems.

Slightly more men with only alcohol problems were divorced than the other groups. Men with combined alcohol and sleep problems, only sleep problems, or neither alcohol nor sleep problems had similar levels of divorce.

Men with alcohol and sleep problems, or only sleep problems received social welfare benefits almost twice as much as men with only alcohol problems or neither alcohol nor sleep problems.

Less men with combined alcohol and sleep problems smoked, than did men in the other groups. Approximately between a fourth and a third of those with only alcohol problems smoked, and approximately a fourth of men with only sleep problems smoked. Over a third of men with neither alcohol nor sleep problems do smoke. Men with combined alcohol problems, only alcohol problems, only sleep problems, and neither alcohol nor sleep problems, had similarities on previous smoking. More men with combined alcohol and sleep problems had never smoked than all other groups, with men with neither alcohol nor sleep problems reported less often to never have smoked.

Men with combined alcohol and sleep problems, only alcohol problems, only sleep problems, or neither problem, had similar levels of low physical activity. Men with both alcohol and sleep problems, or only alcohol problems, did more sedentary activity than those with only sleep problems or neither alcohol nor sleep problems. Slightly more men with neither alcohol nor sleep problems did moderate activity, while there were similarities between men with either alcohol or sleep problems, and men with combined alcohol and sleep problems did moderate activity slightly less. Few men did vigorous activity, with men with only alcohol problems having higher percentage than the other groups.

Table 4

Descriptive statistics for men with both alcohol and sleep problems, only alcohol problems, only sleep problems, or neither sleep nor alcohol problems. Means displayed for the continuous variables

	Alcohol and sleep problems	Only alcohol problems	Only sleep problems	Neither alcohol nor sleep problems
	N (%)	N (%)	N (%)	N (%)
Chronic pain				
No	57 (49.6)	332 (68.9)	227 (53.8)	2737 (78.5)
Yes	58 (50.4)	150 (31.1)	195 (46.2)	748 (21.5)
Cardiovascular disease				
No	109 (94.8)	444 (92.1)	345 (81.8)	3101 (89)
Yes	6 (5.2)	38 (7.9)	77 (18.2)	382 (11)
Divorced				
No	101 (87.8)	408 (83.2)	371 (87.9)	3048 (86.6)
Yes	14 (12.2)	74 (16.8)	51 (12.1)	437 (12.5)
Receives welfare benefits				
No	74 (64.3)	401 (83.2)	300 (71.1)	3018 (86.6)
Yes	41 (35.7)	81 (16.8)	122 (28.9)	467 (13.4)
Smokes				
No, never	40 (34.8)	149 (30.9)	82 (19.4)	580 (16.6)
Yes, previously	56 (48.7)	219 (45.4)	215 (50.9)	1600 (45.9)
Yes, now	19 (16.5)	114 (23.7)	125 (29.6)	1305 (37.4)
Physical activity				
Sedentary	33 (28.7)	125 (25.9)	90 (21.3)	655 (18.8)
Low	57 (49.6)	225 (46.7)	226 (53.6)	1821 (52.3)
Moderate	24 (20.9)	113 (23.4)	97 (23.0)	924 (26.5)
Vigorous	1 (0.9)	13 (3.9)	9 (2.1)	85 (2.4)
	M (SD)	M (SD)	M (SD)	M (SD)
Own health	3.34 (0.77)	3.78 (.73)	3.37 (.78)	3.88 (.71)
Total:	115	482	422	3485

Notes: M=mean; SD=standard deviation.

Group Differences in Combined Alcohol and Sleep Problems, Only Alcohol or Sleep Problems, and Neither Problem

Women with combined alcohol and sleep problems, and only sleep problems had significantly worse reports of own health (table 5). No significant results among women with only alcohol problems when compared to only sleep problems or to the general population. The difference between groups was significant. Men with combined alcohol and sleep problems, and only sleep problems also had significantly worse reports of own health. No significant finds between men with only alcohol problems and the reference group in association to own health.

Table 5

Analyses of covariance of women and men differing in alcohol and sleep problems on subjective health and physical activity as outcome variables

	N	Subjective health		Physical activity	
		B (CI)	p.	B (CI)	p.
Women					
Overall			.000		.319
Sleep and alcohol	90	-.23 (-.38 - -.09)	.002	.00 (-.12-.13)	.954
Only alcohol	254	.03 (-.06-.12)	.491	-.06 (-.14-.02)	.120
Only sleep	967	-.17 (-.23--.12)	.000	.02 (-.03-.07)	.394
General population	3247	0		0	
Men					
Overall			.000		.108
Sleep and alcohol	115	-.14 (-.27--.00)	.043	-.05 (-.19-.04)	.474
Only alcohol	482	-.06 (-.12-.01)	.078	-.07 (-.14-.01)	.069
Only sleep	422	-.17 (-.25--.10)	.000	.05 (-.03-.13)	.226
General population	3485	0		0	

Notes: CI=confidence interval; p.=probability value

Among women, there was a significant risk for experiencing chronic pain when having sleep problems, but not when experiencing combined alcohol and sleep problems, or only alcohol or sleep problems, compared to the reference group (table 6). There was also a significant risk of receiving social welfare benefits when experiencing sleep problems, but not when having both alcohol and sleep problems or only alcohol problems, compared to the reference group. Regarding smoking there is a significant risk between women of all groups; those who experience combined alcohol and sleep problems, and those with either alcohol or sleep problems compared to the reference group. For chronic pain, welfare benefits, and smoking, there are significant differences between groups between women.

Table 6

Logistic regression of women differing in alcohol and sleep problems on chronic pain, heart disease, divorce, receiving welfare benefits, and smoking

	Chronic pain		Heart disease		Divorce		Welfare benefits		Smoking	
	OR (CI)	p.	OR (CI)	p.	OR(CI)	p.	OR (CI)	p.	OR (CI)	p.
Overall		.000		.738		.055				.000
Sleep and alcohol	1.56 (.99-2.46)	.056	1.66 (.52-4.43)	.315	1.55 (.95-2.51)	.079	1.40 (.88-2.23)	.152	2.82 (1.82-4.37)	
Only alcohol	1.05 (.79-1.39)	.753	.86 (.31-2.39)	.770	1.17 (.84-1.63)	.359	.86 (.62-1.20)	.383	1.88 (1.42-2.49)	
Only sleep	2.33 (1.97-2.75)	.000	1.10 (.77-1.56)	.604	.85 (.69-1.05)	.127	1.72 (1.45-2.05)	.000	1.28 (1.06-1.55)	
General population	0		0		0		0		0	

Notes: CI =confidence interval; p.=probability value.

Among men, there was a significant risk for experiencing chronic pain when experiencing combined alcohol and sleep problems, and when experiencing either alcohol or sleep problems compared to the reference group (table 7). For welfare benefits, there was a significant risk when having combined alcohol and sleep problems, and only sleep problems, but not for only alcohol problems compared to the reference group. There was a significant risk for combined alcohol and sleep problems, and only alcohol problems, but not for sleep problems, in association to smoking.

Table 7

Logistic regression of men differing in alcohol and sleep problems on chronic pain, heart disease, divorce, receiving welfare benefits, and smoking

	Chronic pain		Heart disease		Divorce		Welfare benefits		Smoking	
	OR (CI)	p.	OR (CI)	p.	OR(CI)	p.	OR (CI)	p.	OR (CI)	p.
Overall		.000		.106		.115		.003		.000
Sleep and alcohol	2.00 (1.33-3.01)	.001	.42 (.18-1.01)	.052	.83 (.46-1.51)	.542	1.81 (1.17-2.81)	.008	2.27 (1.49-3.45)	.000
Only alcohol	1.41 (1.14-1.75)	.002	1.04 (.72-1.51)	.820	1.29 (.99-1.70)	.064	1.21 (.52-1.58)	.169	2.10 (1.69-2.61)	.000
Only sleep	2.06 (1.64-2.58)	.000	1.22 (.89-1.68)	.212	.82 (.59-1.14)	.240	1.50 (1-15-1.94)	.002	1.11 (.84-1.46)	.468
General population	0		0		0		0		0	

Notes: CI =confidence interval; p.=probability value.

Discussion

The main purpose of this study was to see if combined alcohol and sleep problems were associated to worse outcomes on health, social, and lifestyle factors. Specifically, if there are higher risk for chronic pain, welfare benefits, divorce, smoking, and low physical activity in relation to combined alcohol and sleep problems. This in comparison to having either alcohol or sleep problems, as opposed to having neither alcohol nor sleep problems, in an adult, Northern Norwegian population. Underlying knowledge covers separate alcohol and sleep problems in association with the factors of this study, while our study aims to cover the gap in knowledge of combined alcohol and sleep problems. Results from our study show that there are significant risks in chronic pain, welfare benefits, and smoking associated to combined alcohol and sleep problems. The significant findings were different for women and men, where smoking is the only factor associated with combined alcohol and sleep problems in women.

In women, we found significant risks associated to chronic pain and only sleep problems, social welfare and only sleep problems, and smoking and all groups (combined alcohol and sleep problems, and only alcohol problems, and only sleep problems). This may suggest that among women, sleep is the decisive factor, as it is involved in all significant results. In men we found significant risks associated to chronic pain and only alcohol problems and only sleep problems, welfare benefits and combined problems and only sleep problems, and smoking and combined alcohol and sleep problems, and only alcohol problems. This may suggest that sleep is a decisive factor in men as well, while also alcohol may be related to more challenges in health, social, and lifestyle factors among men than among women. This because we only had one significant finding for women with alcohol problems, which was in association to smoking. No significant findings were made for divorce or

physical activity in neither women nor men. This may suggest that there are other factors involved in outcomes on risks for these factors.

Estimates in chronic pain were similar among women for combined alcohol and sleep problems and having only sleep problems. These estimates are nearly twice the estimates for only alcohol problems and neither alcohol nor sleep problems. Men had lower estimates for chronic pain than women. The tendencies were however, similar to women's estimates, with estimates for combined alcohol and sleep problems and only sleep problems being similar, and nearly twice the estimates for only alcohol problems and neither alcohol nor sleep problems. For chronic pain, previous research states that there is a relationship between sleep problems and chronic pain, and the higher the frequency of pain, the higher the risk for fibromyalgia (Mork & Nilsen, 2012). Our results support this with significant findings on sleep problems in association to chronic pain, in both genders. The relationship have previously been stated to be bi-directional, as both sleep problems and chronic pain increase the risk for each other (McBeth, Wilkie, Bedson, Chew-Graham, & Lacey, 2015). For women we had significant findings on chronic pain only in relation to sleep problems, but for men we had significant findings among those who have combined alcohol and sleep problems, only alcohol problems, and only sleep problems. This suggests that alcohol problems are present in risks among men that experience chronic pain. Previous research claims that regular alcohol consumption may serve as a protective factor for pain when having a chronic pain disease (Bergman, Herrström, Jacobsson, & Petersson, 2002). Women in our study may drink at levels that does not extend to be alcohol problems and may at the same time be protective for chronic pain, as we had no significant findings on alcohol problems in relation to chronic pain among women.

Estimates in welfare benefits also had the same tendencies as chronic pain did, as they were similar among women for combined alcohol and sleep problems and having only sleep

problems. These estimates were nearly twice the estimates for only alcohol problems and neither alcohol nor sleep problems. Among men and welfare benefits, the tendencies were also similar to women's, though they have lower estimates for welfare benefits than women. The tendencies are however, the same, with estimates for combined alcohol and sleep problems and only sleep problems being similar, and nearly twice the estimates for only alcohol problems and neither alcohol nor sleep problems. Previous research identifies sleep problems as one of the main reasons for being absent from work due to sickness, especially among women (Østby, Mykletun, & Nilsen, 2018). This study supports that there are associations between reception of welfare benefits and sleep problems. In relation to socioeconomic status among men, previous research identifies alcohol as a common confounding variable among men (X. Li, Sundquist, & Sundquist, 2008). This is supported by findings from our study, with combined alcohol and sleep problems among men being significant.

Among women and smoking, the highest estimates were for combined alcohol and sleep problems, and the lowest estimates were for neither alcohol nor sleep problems. Only alcohol and only sleep problems were in between those estimates, with only alcohol problems having higher estimates than only sleep problems. Among men the opposite tendencies were observed, with estimates for smoking being lowest in the combined alcohol and sleep problems, and highest for neither alcohol nor sleep problems. Only alcohol and only sleep problems were in between those estimates, with only sleep problems having slightly higher estimates than only alcohol problems. Results from our study supports previous research that suggest that smoking is often present in other risky health behaviours, such as consuming alcohol, in both genders (Noble, Paul, Turon, & Oldmeadow, 2015). However, women have more symptoms of sleep problems that are related to smoking than men have (Wetter & Young, 1994). This is being supported by our findings that smoking among have significant

findings in all groups (combined alcohol and sleep problems, only alcohol problems, and only sleep problems). Among men, the significant findings were on combined alcohol problems and only alcohol problems, suggesting an association between smoking and alcohol problems among men.

For cardiovascular disease, divorce, and physical activity among both women and men we did not have any significant findings. Previous results have identified angina as the only cardiovascular disease to be directly associated to sleep problems (Newman et al., 1997). Our study did not investigate the separate types of cardiovascular diseases and supports the lack of findings among other cardiovascular diseases. Divorce have previously been associated to sleep problems in women (van de Straat & Bracke, 2015), and alcohol problems among men (Dinescu et al., 2016). Our results were not in line with these previous findings. The reasons for this may be that participants that have been divorced have remarried, which may serve as a protective factor. Also, those that have increased problems in relation to divorce may not have participated in the Tromsø Study, meaning that we do not have data on them. Low physical activity has previously been found to be associated to risks in health behaviours (such as alcohol consumption and sleep behaviour) (Chaput et al., 2009). On the other hand, physical activity, even at low levels, have been determined as positive for health factors, and in treatment for alcohol and sleep problems (Sherrill, Kotchou, & Quan, 1998). This indicates that there are associations between physical activity and alcohol and/or sleep problems, despite our study not having any significant findings. However, the associations to physical activity in alcohol and/or sleep problems may be indirect and caused by intermediate variables, which could explain the lack of any significant findings.

With estimates being so similar for combined alcohol and sleep problems, to estimates of only sleep problems in several factors, it seems that sleep problems are more important in association to other factors. However, as we could not find significant results for women and

alcohol problems, it could mean that the decided cut-off score in AUDIT for women is too low. This may give us a group we should not have. Women who do not have alcohol problems may be classified as women with alcohol problems, and by that alcohol problems and risks associated are not tested per se. This may be a reason for why we cannot find an effect of alcohol problems, or additional effects of alcohol in the combined alcohol and sleep problem group.

This study did not take into consideration the causality of combined alcohol and sleep problems in association to the other factors. This study merely uncovered that there are risks associated to having combined problems in relation to health, social, and lifestyle factors. Further studies should research the direction of relationships, for example whether combined alcohol and sleep problems increases the risk for receiving welfare benefits, if receiving welfare benefits increase the risk for combined problems, or if the factors have a bi-directional relationship.

Strengths and Limitations

For recognising alcohol problems, an already established method of measure was used (AUDIT). The cut-off score is well established in men, which is also reflected in our results. The cut-off score for women is lower, and this study show no great significance in alcohol problems, except for combined problems and smoking. This might mean that the cut-off score for women is too low. The results may be influenced by the fact that women with less problematic alcohol use are within the same group as those with more severe alcohol use, covering the severity of the alcohol problems. Another interesting point may be that women with alcohol problems is a well-functioning group. Their alcohol problems may not be severe enough to affect their lives negatively. Again, this may also be related to the low cut-off for women.

This study is based on the populational study, the Tromsø Study, which had a great number of participants above the age of 30 that were randomly chosen and is based on the general population. The target population for clinical studies are often within a certain area of interest and participants must meet participation criteria to participate in the study. In addition, clinical studies often compare their group of interest with other specific interests, for example treatment or intervention, or non-intervention group, or other. This populational study compare the three groups that experience alcohol and/or sleep problems with the general population. This may give results that are representative for the general population. Populational studies may also include participants with diagnoses that also are interesting for clinical studies, these participants are also among the general population, except we do not know their potential diagnosis at the start of the study.

This study may be suffering from a few biases, such as a non-response bias, and social desirability. People with alcohol problems more often do not participate in populational studies (Christensen et al., 2015). Due to high alcohol consumption they do not participate, as opposed to people with low alcohol consumption, and are therefore under-represented in populational studies (Torvik, Rognmo, & Tambs, 2012). All data in our study were collected based on self-report forms. This may have affected our results, as participants may have given replies based on own memory, or perception of alcohol intake, sleep, and health, social, and lifestyle factors. When replying to answers on own life, self-knowledge and honesty is important to give true results, however this may be difficult for participants, which is difficult to control for in population studies. As consequence, the results may be affected by social desirability. When answering on how much alcohol participants consume, participants often under-report (Stockwell et al., 2004). This also extends to reporting on how many “standard drinks” one consumes, as the amount in a “standard drink” varies depending on the alcoholic beverage. Smoking is also often under-reported by participants when conducting studies

based on self-reports (Gorber & Tremblay, 2016; Robinson et al., 1997). Chronic pain is not necessarily under- or over-reported, but the severity of chronic pain may not be accurately reported when self-report forms are used (Robinson et al., 1997). On the other hand, physical activity is often over-reported when using self-report forms (Adams et al., 2005). This under- or over-reporting may also be present in our study, affecting our results. Our study included only one question on experience of chronic pain and one question for sleep problems. This may give larger samples of participants in these groups than we would have had, had we known if they had clinical sleep problems or a chronic pain diagnosis.

Previous studies on alcohol and sleep problems, have found that low educational level is a possible risk factor in some of the factors this study takes into consideration (smoking, welfare benefits, cardiovascular disease) (Laaksonen et al., 2007; Smit, Hoeymans, Verkleij, & Kromhout, 1996). Our study did not include educational level, and future studies should consider including educational level when studying combined alcohol and sleep problems in the future.

Conclusion

This study found that there are higher risks in association to chronic pain, reception of welfare benefits, and smoking, among men when having combined alcohol and sleep problems. Among women there are higher risks in association to smoking when having combined alcohol and sleep problems. Even so, it seems that sleep is the decisive factor, given that it is significant in findings for both women and men in association to chronic pain, reception of welfare benefits, and smoking. This study has contributed with uncovering some risks in association to combined alcohol and sleep problems in association to health, social, and lifestyle factors. Future studies should investigate causality between combined problems, in association to health, social, and lifestyle factors.

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